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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,349	07/15/2004	Takayuki Watanabe	04208.0204	7885
22852 7590 01/23/2007 FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413			EXAMINER GOODWIN, DAVID J	
			ART UNIT	PAPER NUMBER
			2818	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/23/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/501,349

Applicant(s)

WATANABE ET AL.

Examiner

David Goodwin

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-30 is/are pending in the application.
- 4a) Of the above claim(s) 18-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 13-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

1. Claims 9, 10, 11, 13 through 17 are objected to because of the following informalities:  
informalities:
2. Claim 8 line 11 recites "and makes contact with the semiconductor thin films only with said active layer." It is unclear from this statement whether the electrode makes contact with all of the semiconductor thin films or only with the active layer.
3. Claims 9, 10, 11, 13 through 17 are objected to as incorporating claim 8.
4. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 through 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Shibasaki (US 5,453,727).
3. Regarding claim 1.
4. Shibasaki teaches a semiconductor device. Said device comprises a stacked structure (fig 2). Said stack is formed on a substrate (1). Said stack comprises a first compound semiconductor layer (2). Said stack comprises an active sensor layer (7).

Said stack comprises a second compound semiconductor layer (6) (column 4 lines 5-25). Said first and second compound semiconductor layers comprise AlGaSb, GaAsSb, AlAsSb, or AlInAsSb (column 5 lines 30-40). Said active sensor layer comprises Indium. $x$ . Gallium. $1-x$ . Arsenic. $y$ . Antimony. $1-y$ , wherein  $x$  is in the range of 0.8-1.0 and  $y$  is in the range of 0.8-1.0 (column 4 lines 35-50). Said first (2) and second (6) compound semiconductor layers have a band gap that greater then the active sensor layer (7) (column 5 lines 40). Said first (2) and second (6) compound semiconductor layer shave a resistance that is more than 5 times greater than the active sensor layer (7) (column 5 lines 20-30). The first semiconductor layer has a lattice constant that is the same as the sensor layer (column 3 lines 45-50). The second semiconductor layer has a lattice constant that is the same as the sensor layer (column 3 lines 1-10). Said first and semiconductor layers have a lattice constant that is within 2 percent of the active sensor layer (column 5 lines 50-55). Said active sensor layer is less than 0.1 micrometers (column 4 lines 45-50).

5. Shibuski teaches a specific example (4) of the device. Said example comprises a first layer of semiconductor,  $\text{Al}_{.8}\text{Ga}_{.2}\text{As}_{.16}\text{Sb}_{.84}$ , is formed on a substrate. An active sensor layer of  $\text{In}(X)\text{As}(1-X)\text{As}(Y)\text{Sb}(1-Y)$ , wherein  $X=1$  and  $Y=1$ , is formed thereon and having a thickness of 100nm. A second layer of semiconductor,  $\text{Al}_{.8}\text{Ga}_{.2}\text{As}_{.16}\text{Sb}_{.84}$ , is formed over the sensor layer (column 13 lines 5-40). The semiconductor layers have a lattice constant of 6.0464 angstroms and the active sensor layer has a lattice constant of 6.0584 angstroms. Said lattice constants differ by 0.2% which is between 0.1 and 1.0%.

6. Regarding claim 2.

7. The compound semiconductor stack comprises a third compound semiconductor layer stacked on said second semiconductor layer (6) (column 6 lines 1-10). Said third compound semiconductor layer comprises GaAs (column 5 lines 30-40).

8. Regarding claim 3.

9. Said active sensor layer comprises InAs (column 13 lines 5-25).

10. Regarding claim 4.

11. Said first and second compound semiconductor layer comprise Aluminum.a. Gallium.1-a. arsenic.c. antimony.1-c. wherein a is in the range of 0.0-1.0 and c is preferably in the range of 0.0-0.4 (column 5 lines 30-45) (column 13 lines 5-25).

12. Regarding claim 5.

13. The stacked structure comprises a magnetic sensor (column 2 lines 55-65). The stack further comprises electrodes layer (4) (fig 2) (column 1 lines 10-20) (column 13 lines 40-60).

14. Regarding claim 6

15. The stack comprises a device that is very small, on the order of micrometers (column 5 lines 60-65) and therefore is very mobile.

16. Regarding claim 7

17. The use of the device in a phone comprises functional language.

18. The limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA

1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

19.

***Claim Rejections - 35 USC § 103***

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. Claims 8 through 11 and 13 through 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibasaki (US 5,453,727) in view of Shibaski (US 6,590,389).

22. Regarding claim 8.

23. Shibasaki (US 5,453,727) teaches a device is that uses the Hall effect (column 4 lines 5-15). Said device comprises a stack comprising an active sensor layer (7). Said stack comprises a first compound semiconductor layer (2). Said stack comprises a second compound semiconductor layer (6) (column 4 lines 5-25). Said first and second compound semiconductor layers comprise AlGaSb, GaAsSb, AlAsSb, or AlInAsSb (column 5 lines 30-40). Said active sensor layer comprises Indium.x. Gallium.1-x. Arsenic.y. Antimony.1-y. wherein x is in the range of 0.8-1.0 and y is in the range of 0.8-1.0 (column 4 lines 35-50). The stack further comprises electrodes (4) (fig 2) (column 1

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lines 10-20). Said electrode layer (4) comprise metal (column 6 lines 40-50).

Passivation is formed over the semiconductor as required (column 4 lines 20-25) (fig 2).

24. Shibasaki (US 5,453,727) does not teach that the electrode are formed on the passivation

25. Shibasaki (US 6,590,389) teaches forming a passivation layer (3) directly on a top and side surfaces of the semiconductor of a hall device. Forming a metal film (5) on said passivation and a part of the active layer and is electrically isolated by the passivation layer (fig 2b) (column 12 lines 10-40)

26. It would have been obvious to one ordinary skill in the art form the metal electrode layer over the passivation layer so that the electrode will only contact the semiconductor in specified locations and will be isolated from semiconductor in non-specified locations.

27. Regarding claim 9.

28. Shibasaki (US 5,453,727) Said first and second compound semiconductor layers comprise AlGaSb, GaAsSb, AlAsSb, or AlInAsSb (column 5 lines 30-40).

29. Regarding claim 10.

30. Shibasaki (US 5,453,727) the compound semiconductor stack comprises a third compound semiconductor layer stacked on said second semiconductor layer (6) (column 6 lines 1-10). Said third compound semiconductor layer comprises GaAs (column 5 lines 30-40).

31. Regarding claim 11.

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32. Shibasaki (US 5,453,727) the substrate (1) comprises GaAs or Si (column 6 lines 60-67). The active layer comprises InAs (column 4 lines 35-50). Said first and second compound semiconductor layer comprise Aluminum.a. Gallium.1-a. arsenic.c. antimony.1-c. wherein a is in the range of 0.0-1.0 and c is preferably in the range of 0.0-0.4 (column 5 lines 30-45).

33. Regarding claim 13.

34. Said device is a magneto sensitive pattern and uses the Hall effect (column 4 lines 5-15). Said device comprises an active sensor layer having Indium.x. Galium.1-x. Arsinic.y. Antimony.1-y., wherein x is in the range of 0.8-1.0 and y is in the range of 0.8-1.0 (column 4 lines 35-50). Said active sensor layer is less than 0.1 micrometers (column 4 lines 45-50). Said active sensor is sandwiched between a first (2) and a second (6) compound semiconductor layers (column 4 lines 5-20).

35. Shibuski teaches a specific example (4) of the device. Said example comprises a first layer of semiconductor,  $\text{Al}_{.8}\text{Ga}_{.2}\text{As}_{.16}\text{Sb}_{.84}$ , is formed on a substrate. An active sensor layer of  $\text{In}(X)\text{As}(1-X)\text{As}(Y)\text{Sb}(1-Y)$ , wherein  $X=1$  and  $Y=1$ , is formed thereon and having a thickness of 100nm. A second layer of semiconductor,  $\text{Al}_{.8}\text{Ga}_{.2}\text{As}_{.16}\text{Sb}_{.84}$ , is formed over the sensor layer (column 13 lines 5-40). The semiconductor layers have a lattice constant of 6.0464 angstroms and the active sensor layer has a lattice constant of 6.0584 angstroms. Said lattice constants differ by 0.2% which is between 0.1 and 1.0%.



36. The resistance sensitivity under applied voltage and magnetic fields and conditions is inherent to the materials and structure used. As the claimed structure is the same the resistance sensitivity will be the same.

37. Further, response to voltage and magnetic fields is functional language.

38. The limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

39. Regarding claim 14.

40. Said active sensor layer (7) is sandwiched between lower (2) and upper (6) layers (fig 2) (column 4 lines 5-20). Said first and second compound semiconductor layers comprise AlGaSb, GaAsSb, AlAsSb, or AlInAsSb (column 5 lines 30-40).

41. Regarding claim 15.

42. Using the said device as a pointing device is functional language.

43. The limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of

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structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does."

*Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

44. Regarding claim 16.

45. Using the said device as an open/close detection switch is functional language.

46. The limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

47. Regarding claim 17.

48. Using the said device as a geomagnetic direction sensor is functional language.

49. The limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does."

*Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

50. Regarding claim 13.

51. Said device is a magneto sensitive pattern and uses the Hall effect (column 4 lines 5-15). Said device comprises an active sensor layer having Indium.x. Gallium.1-x. Arsenic.y. Antimony.1-y., wherein x is in the range of 0.8-1.0 and y is in the range of 0.8-1.0 (column 4 lines 35-50). Said active sensor layer is less than 0.1 micrometers (column 4 lines 45-50). Said active sensor is sandwiched between a first (2) and a second (6) compound semiconductor layers (column 4 lines 5-20).

52. The resistance sensitivity under applied voltage and magnetic fields and conditions is inherent to the materials and structure used. As the claimed structure is the same the resistance sensitivity will be the same.

53. Further, response to voltage and magnetic fields is functional language.

54. The limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does."

*Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

55. Regarding claim 14.

56. Said active sensor layer (7) is sandwiched between lower (2) and upper (6) layers (fig 2) (column 4 lines 5-20). Said first and second compound semiconductor layers comprise AlGaSb, GaAsSb, AlAsSb, or AlInAsSb (column 5 lines 30-40).

57. Regarding claim 15.

58. Using the said device as a pointing device is functional language.

59. The limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

60. Regarding claim 16.

61. Using the said device as an open/close detection switch is functional language.

62. The limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does."

*Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

63. Regarding claim 17.

64. Using the said device as a geomagnetic direction sensor is functional language.

65. The limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does."

*Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

### ***Response to Arguments***

66. Applicant's arguments with respect to claims 1 through 11 and 13 through 17 have been considered but are moot in view of the new ground(s) of rejection.

67. The applicant argues that the prior art does not anticipate the applicants claimed range for layer thickness and lattice constant difference.

68. However a specific example within the range anticipates said range. 2131.03.I.

### ***Conclusion***

69. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Goodwin whose telephone number is (571)272-8451. The examiner can normally be reached on Monday through Friday, 9:00am through 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571)272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJG

*Andy Hupel*  
Andy Hupel  
Primary Examiner

70.